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But of what are moral persons constituted? For what do they live? Wherein lies the virtue of their autonomy? To what end are they free? And what is the relation of this transcendental *noblesse oblige* to the cravings and passions of men, to the moving springs of the natural life, to the whole upward struggle of animals and men?

There is no answer to these questions short of a definition of the moral good in terms of desire and interest. There is a certain dignity and worthiness of respect in Renouvier's uncompromising moralism. But there is no virtue in opposing formalism to materialism. The defect of materialism lies not in the concessions it makes to concrete interests, but in the undue weight which it attaches to *some* interests. It is possible to discover principles that are the very conditions of practical success and failure, but which are at the same time universally valid and unlimited in scope.

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Logique et Mathématiques. ARNOLD REYMOND. Saint-Blaise: Foyer Solidariste. 1908. Pp. ix + 218.

Many writings concerning the relations of logistic and mathematics are obscured by the rigid partisanship of their authors, but the present work is not of this sort. M. Reymond conceives his problem broadly: "Whether mathematics may or may not be considered as a branch of logistic, the solution of this problem would matter little, if it did not involve a more vital question. However remote it may appear to be from reality, mathematics preserves, like reality, a synthetic element, refractory to all analysis—to wit, *le devenir*. . . . It is the autonomy of life in general and of thought in particular that the mathematician defends in refusing to see in numbers and their infinitely varied combinations pure logical constants, *i. e.*, static and mumified elements" (p. viii). The conception of infinity is the strategic point of the defence.

If this book is taken as a criticism of existing derivations of mathematics from logistic, it seems to stand on firm ground. On the other hand, if it is taken as a refutation of Mr. Russell's thesis that mathematics is nothing but formal logic, it is open to question. The accepted "logical constants" may be inadequate, but the list is not of divine origin nor is it as the laws of the Medes and Persians. Neither thinking in general, nor mathematical thinking, exists when there is nothing given to think about; but, in so far as mathematics can limit itself, as pure or abstract mathematics does, to questions of relations between entities wholly unspecified except as to their relational values, logistic, the study of all general types of deduction, ought to give it adequate foundation.

M. Reymond's argument is as follows: The early expressed antinomies of the infinite arise from a confusion of the continuum of pure analysis and that of spacial intuition. "So, for the continuity given in spacial intuition, pure analysis substitutes a numerical continuity, a schema equivalent to the first and one which satisfies all its needs" (p. 117). This is not, however, asserting that the analytic continuum is adequate to space. Thus "to conclude that two unequal quantities must be equal from the fact that they are indefinitely divisible, would be to suppose that all quantities are equal to each other simply because they are continuous, and this supposition would take away from analysis all possibility of being applied to spacial extent" (p. 128).

But the real test of the adequacy of logistic to mathematics is the definition of the class (*ensemble*) of whole numbers in terms of logical constants. Non-contradiction in the definition is the negative condition of existence. "The presence of contradiction in a concept shows that it does not satisfy the conditions of the existence of its object, conditions otherwise known or laid down *a priori*" (p. 161). "To reduce mathematics to logistic comes then to stating an equivalence between the conditions of existence which are peculiar to the objects of these sciences" (p. 163).

The logistical definition of the whole numbers depends upon the concept of zero and of the null class. "But nothing (numerically) is not nothing (logically), for, if the arithmetical zero . . . is nothing with respect to realized numbers, it is nevertheless a concept which exists for logic like all the others. The logical nothing is then always something; it is a concept which denotes every absolutely undetermined object over against a determined class" (p. 172). The logical zero is, therefore, not a singular class and can not serve to prove the existence of 1, and so the existence of all the whole numbers remains problematic.

The principle of mathematical induction also can not be expressed by way of logical deduction. *All* the finite numbers have not the same meaning as *all* men, for numbers have nothing in common but a law of succession, and are in no sense given when their class concept is defined. The inductive law of mathematics assures the logical impossibility of completing numerical series, *i. e.*, of the existence of *all* numbers, and not merely a practical impossibility. The cardinal numbers, defined as classes of classes, are logical entities, but distinct from arithmetical numbers because they can be applied only to finite classes and no law of succession characterizes them (cf. p. 175).

To define transfinite cardinal numbers, the notion of correspondence must be completed by the principle of induction. Granting this, we find denumerable and non-denumerable classes (ensembles) and Cantor's transfinites can be constructed, but they have only relative significance. To Cantor can be opposed this dilemma: "Either the series

$$\omega, \omega^{\omega}, \cdots, \omega^{\omega^{\omega^{\cdot^{\cdot^{\cdot}}}}}$$

is always denumerable and in this case the limit Ω would have only the first power; or else this series is not denumerable and in this case we have no right to affirm that it has a limit" (p. 189). The idea of limit depends on that of succession. All the antinomies of the transfinite arise from the assumption of a realized infinite number, which is an impossibility.

As logistic is inadequate to ground mathematics, its task should not be the restatement of mathematics, but it should seek "to reorganize and characterize the indefinables peculiar to each science that the human mind studies, that is to say, to determine the different conditions of existence, irreducible in themselves, which are peculiar to different groups of logical concepts" (p. 208). It studies the foundations of all sciences in relation to its own.

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Education: An Essay and Other Selections by Ralph Waldo Emerson. Riverside Educational Monographs. Edited by HENRY SUZZALLO. Boston, New York, and Chicago: Houghton, Mifflin Company. 1909. Pp. vii + 75.

The publishers are to be congratulated upon the useful and handy series of educational monographs of which the present volume is the first to be issued. Students of education as well as the general public are likely to be grateful for the reprinting in inexpensive and compact form of classic essays and sayings on education, otherwise scattered through the complete works of their writers or through files of periodicals and educational reports. The series aims also to present in simple and untechnical language discussions of modern problems by educational experts.

This little collection of Emerson's writings on education contains the essay, "Education" from the "Lectures and Biographical Sketches," "Culture in Education," and "Power in Education" from "The Conduct of Life," and "The Training of Manual Work" from "Man the Reformer" in "Nature, Addresses, and Lectures"; as well as a brief introduction by Professor Suzzallo. It surprises the reader by its timeliness, and vindicates anew Emerson's right to the title of seer. Our educational consciousness recognizes almost as commonplaces the maxims of the great transcendentalist, although even now our practise is only beginning to be modified by our theory. In fact, any reading of the great writers on education from Plato down, convinces one that they have always got at the root of the matter. Our contribution is the application of scientific method to the working out and adapting to modern conditions of their high imaginations. In the midst of our engrossment in means and technique it is liberalizing and refreshing to get a view of education as a great human undertaking through such eyes as Emerson's. The same thing might well be done for Carlyle and some of our other modern prophets; it has been done in England, I believe, for Ruskin.

The dominant quality of these selections, as one reads them again from the point of view of modern education, is their human-ness. If Emerson was a philosopher, he was also a shrewd and kindly New Englander of the best type, and he says many things that are both wise and homely. Surely our age, far more than his, needs the gospel that material things must be humanized if we are to consider ourselves educated, must not be scorned or worshipped, but recognized and valued as means to fuller human life. "Victory over things is the office of man. Of course, until it is accomplished, it is the war and insult of things over him" (p. 3). "In some sort the end of life is that the man should take up the universe into himself" (p. 7) "it becomes the office of a just education to awaken him to a knowledge of this fact" (p. 8).